भारतीय मानक
Indian Standard

IS 1375 : 2021

काला सीसा पेंसिल — विशिष्टि

(दूसरा पुनरीक्षण)

Black Lead Pencils — Specification

(Second Revision)

ICS 87.080

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भारतीय मानक ब्यूरो
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November 2021 **Price Group 6**

Printing Inks, Stationery and Allied Product Sectional Committee, CHD 14

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Printing Inks, Stationery and Allied Product Sectional Committee had been approved by the Chemical Division Council.

This standard was first published in 1959 and subsequently revised in 1981, incorporating additional grades and also to incorporate certain changes in the requirements.

The second revision of this standard is being revised again to incorporate the Amendment No. 1 and update the standard with regard to the referred standard.

The composition of the Committee responsible for the formulation of this Standard is given at Annex F.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BLACK LEAD PENCILS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard covers the requirements for various types of pencils such as drawing pencils, carpenter's pencils, stenographer's and reporter's pencils, and pencils for general writing.

2 REFERENCES

The standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid.. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
3084 : 1989	Pencil slats — Specification (*second revision*)
1070 : 1992	Reagent grade water (*third revision*)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Black Lead Pencil

A pencil in which the slip, made basically of graphite and clay, is fixed in a wooden casing.

3.1.1 *Drawing Pencil* — A black lead pencil, in different grades; intended for drawing purposes.

3.1.2 *Carpenter's Pencil* — A black lead pencil used by carpenters for marking on wood.

3.1.3 *Stenographer's and Reporter's Pencil* — A black lead pencil used by stenographers and reporters for writing in shorthand.

3.1.4 *General Writing Pencil* — A black lead pencil used for general purposes.

4 GRADES

4.1 Drawing pencils shall be supplied in the following grades, as specified by the purchaser:

6B; 5B; 4B; 3B; 2B; B; HB; H; 2H; 3H; 4H; 5H; and 6H.

NOTE — B denotes softness and darkness of pencil and H denotes the hardness of pencil. For example, pencil of grade 6B is the softest, darkest pencil and pencil of grade 6H is the hardest, lightest pencil (*see* **7.5** and **7.7**).

4.2 Pencils for carpenters, for stenographers and reporters shall generally be of grade HB only.

4.3 Pencils for general writing shall be supplied in the following grades:

a) Hard — H, 2H;
b) Medium — HB; and
c) Soft — B, 2B.

5 MATERIAL AND WORKMANSHIP

5.1 Slip

The slip shall be in one piece, of uniform grading, free from grittiness and so basically made of graphite and clay as to produce smooth, even and uniform writing. It shall be sufficiently strong to withstand sharpening by a sharp knife or standard pencil sharpener and shall not break on mending or writing.

5.2 Casing

The casing shall be made from pencil slats conforming to IS 3084. It shall be readily cut with an ordinary pocket knife with a reasonably sharp blade. When sharpened with a standard pencil sharpener, the wood shall take a smooth and even finish. Both halves of the wood casing shall be securely glued together throughout their length. The casing shall enclose the slip in a neatsecure manner, in such a way that the slip is centered. The warpage in 80 percent of the sample shall not exceed 0.5 mm, and in the remaining 20 percent of the sample, the warpage shall not exceed 1.0 mm.

5.3 The workmanship shall conform to the best trade practice.

6 SHAPES AND DIMENSIONS

6.1 Shapes

Carpenter's pencils shall be oval in section; Stenographer's and reporter's pencils shall be round, and the section of all other categories of pencils shall be round or hexagonal, as specified by the purchaser.

6.2 Dimensions

6.2.1 The length of the pencils shall be 177 ± 3 mm.

6.2.2 The diameter of pencils, other than carpenter's pencils, shall be between 7.5 and 8.0 mm for varnished or lacquered pencils and between 7.0 and 7.6 mm for unvarnished and unlacquered pencils. In the case of hexagonal pencils, the diameter shall be taken as the distance between any two opposite coiners.

6.2.3 The cross-section of the carpenter's pencils shall be oval with the ends of the major axes trimmed straight. The dimensions of the cross-sections of carpenter's pencils shall be as indicated in either Fig. 1A or Fig. 1B.

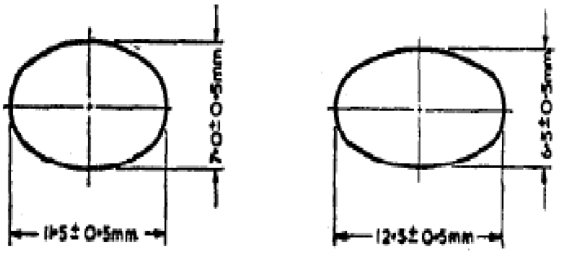


FIG. 1 CROSS-SECTION OF CARPENTER'S PENCILS

Pencils in one carton shall be of the same dimension.

6.2.4 The diameter of slips used in the manufacture of pencils, other than carpenter's pencils, shall be as under:

	Pencils	*Diameter of Slip* mm
a)	Drawing pencils, Grades 6H, 5H, 4H, 3H, 2H, H and HB	1.90 to 2.30
b)	Drawing pencils, Grades B, 2B, 3B and 4B	2.10 to 3.20
c)	Drawing pencils, Grades 5B and 6B	3.50 to 3.60
d)	Stenographer's and reporter's pencil	2.10 to 3.00
e)	General writing pencil, Grades 2H, H, HB	1.90 to 2.30
f)	General writing pencil, Grades B, 2B	2.10 to 3.20

6.2.4.1 The slips of carpenter's pencils shall be rectangular and of the following dimensions:

Width	4.4 to 5.0 mm
Thickness	2.0 to 2.5 mm

7 TESTS

7.1 Uniformity of Slip

This test is intended to check the continuity of slips and their uniformity of manufacture.

7.1.1 The electrical resistance of the slip shall be measured with any suitable instrument. The coefficient of variation of the resistance, when calculated by taking a class range of 5 ohms, shall not exceed 20 percent. The method of calculation is described in Annex A.

7.2 Gluing and Warpage of Wood Casing

Finished pencils shall be kept for 48 h in a desiccator filled with reagent grade water (*see* IS 1070). The casing shall not separate. The warpage at the test shall be recorded (*see* **5.2**).

7.3 Diameter of Slip

The slip shall be taken carefully out of the casing with a knife. The diameter of the slip shall be measured.

7.4 Strength of Slip

When tested by the method described in Annex B, the transverse strength of the slip of pencils, other than carpenter's and drawing pencils of Grades 4H, 5H and 6H, shall be not less than 2.05 kg.

7.4.1 In the case of carpenter's pencils, when the flat side of the slip is placed on the supporting edges, the strength of the slip shall be not less than 4.10 kg.

7.4.2 In the case of drawing pencils of Grades 4H, 5H and 6H, the strength of the slip shall be not less than 2.95 kg.

7.5 Wear of Slip

When tested by the method prescribed in Annex C, the wear of the slip shall be as under:

	Type and Grade of Pencils	*Wear of Slip, Max, mm/line*
a)	Drawing pencils, Grades 6H, 5H and 4H	0.4
b)	Drawing pencils, Grades 3H, 2H, H and HB	0.5
c)	Drawing pencils, Grades B, 2B, 3B, 4B, 5B and 6B	0.6
d)	Pencils for general writing, Grades 2H, H and HB	0.5
e)	Pencils for general writing, Grades B and 2B	0.6
f)	Carpenter's pencils	0.4
g)	Stenographer's and reporter's pencils	0.5

7.6 Friction of Slip

When determined by the method specified in Annex D, the friction of the slip shall be not more than 0.20 for all types of pencils.

7.7 Blackness of Pencil Marking

When tested by the method described in Annex E, the blackness as measured from the reflectance values of the markings for the different grades, shall be as under:

Type an Grade of Pencil	*Blackness Index (Percent Reflectance)*
Pencils for general writing, hard grade	71 ± 2
Pencils for general writing, medium grade	70 ± 2
Pencils for general writing, soft grade	66 ± 2
Carpenter's pencils	70 ± 3
Stenographer's and reporter's pencils	68 ± 3
Drawing pencils, Grade 6H	77 ± 1
Drawing pencils, Grade 5H	75 ± 1
Drawing pencils, Grade 4H	74 ± 1
Drawing pencils, Grade 3H	73 ± 1
Drawing pencils, Grade 2H	71 ± 1
Drawing pencils, Grade H	69 ± 1
Drawing pencils, Grade HB	68 ± 1
Drawing pencils, Grade B	66 ± 1
Drawing pencils, Grade 2B	65 ± 1
Drawing pencils, Grade 3B	63 ± 1
Drawing pencils, Grade 4B	62 ± 1
Drawing pencils, Grade 5B	60 ± 1
Drawing pencils, Grade 6B	59 ± 1

7.8 Chemical Inertness of Pencil Markings

When a paper marked with pencil lines is dipped in hydrogen peroxide, it shall not be affected by the latter.

7.9 The lacquer over the pencils shall be non-toxic.

7.10 Slide of Slip

The pencil shall be so mended that about 3 mm of the slip protrudes out of the wooden casing. The other end of the pencil shall show the slip end clearly and no lacquer or paint shall be present on the end. A load of 50 N shall be applied vertically on the wooden casing, while the protruding end of the slip rests on a glass sheet with the pencil in vertical position. The slip shall not slide in the pencil casing.

8 SAMPLING

Sampling procedure shall be a subject of agreement between the bulk buyers and the supplier.

8.1 Sealed Samples

If in order to illustrate or specify the general appearance, grades, shapes and dimension a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects. The custody of the sealed sample shall be a matter of prior agreement between the purchaser and the supplier.

9 MARKING AND PACKING

9.1 Each pencil shall be marked with:

a) the name and trade-mark of the manufacturer or the supplier,
b) grade, and
c) other indications which may be specified by the purchaser.

9.2 BIS Certification Marking

Pencils may also be marked with the BIS Certification Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and Rules and Regulations made thereunder. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

9.3 Packing

Ten pencils of the same grade and type shall be pasted with a paper band, bearing the name or trade-mark of the manufacturer, type and grade of pencils. Ten such packets shall be packed in a cardboard box. Each such box shall be marked to indicate the type, quantity and grade of pencils contained therein.

ANNEX A

(*Clause* 7.1.1)

UNIFORMITY OF SLIP

A-1 PROCEDURE

A-1.1 For this test, 100 pencils selected at random from a given lot shall be taken. The ends of the pencils shall be cleaned with sand paper and the electrical resistance of each slip shall be measured with a multi-range ohmmeter. The values of the resistance obtained shall be recorded. From the values obtained, the arithmetical mean value of the resistance and the coefficient of variation could be calculated. The method described here for the calculation of the arithmetical mean and the coefficient of variation would result in considerable saving in labour, as compared to their computation from individual measurements.

A-1.2 In this method, the pencils shall be grouped in different classes according to the values of the resistance obtained. The width of the class (W) shall be taken as 5 ohms. The mid-value of each class is called the class mark. In Table 1, the class range, and the class marks are given in col 1 and 2, respectively. Co1 3 gives the frequency (f) or the number of pencils falling in each class.

A-1.3 The method of computation involves the assumption that the members grouped in each class actually were at the mid-point of their class. This assumption may not be strictly correct, but the individual discrepancies usually balance out, so that the net error is unimportant in practice.

A-1.4 Provisional mean (r) of the resistance values could be judged by inspection of the distribution of pencils falling in different class ranges. It is seen from Table 1 that 70 percent of the pencils fall in the class range having the class marks of 17.5 ohms and hence the provisional mean value may be taken as 17.5 ohms.

A-1.5 Take the class range giving the provisional mean as the origin. Classes having higher resistances may be marked + (positive) and those having lower resistance may be marked – (negative). The distances (d) of each class from the origin are indicated in co1 4. The moments ($f \times d$) about the origin are given in co1 5. Co1 6 gives the second moments ($f \times d^2$). The average resistance (R) is given by:

$$R = \text{Provisional resistance } (r) + \left\{\frac{\Sigma(f\times d)}{f}\times W\right\} \text{ ohms}$$

$$= 17.5 + \frac{9}{100} \times 5 = 17.95 \text{ ohms}$$

The standard deviation (σ) is given by:

$$\sigma = W\left\{\frac{\Sigma f\times d^2}{\Sigma f} - \left(\frac{\Sigma f\times d}{\Sigma f}\right)^2\right\}^{½}$$

$$= 5\left\{\frac{51}{100} - \left(\frac{9}{100}\right)^2\right\}^{½} = 5\times\frac{70.8}{100} = 3.540$$

Coefficient of variation,

$$\text{percent} = \frac{\textit{Standard deviation}}{\textit{Mean}}\times 100 = \frac{3.540}{17.95}\times 100 = 19.7$$

Table 1 Calcualtion of Standard Deviation and Coefficient of Variation

Class Range ohms (1)	Class Marks W (2)	No. of Pencils f (3)	Class Distance D (4)	Moment $f \times d$ (5)	2nd Moment $f \times d^2$ (6)
Below 5.0	2.5	0	– 3	0	0
5.1-10.0	7.5	2	– 2	– 4	8
10.1-15.0	12.5	10	– 1	– 10	10
15.1-20.0	17.5	70	0	– 14	0
20.1-25.0	22.5	13	+ 1	+ 13	13
25.1-30.0	27.5	5	+ 2	+ 10	20
30.1-35.0	32.5	0	+ 3	0	0
				+ 23	
				+ 9	51

ANNEX B

(*Clause* 7.4)

DETERMINATION OF TRANSVERSE STRENGTH OF PENCIL SLIP

B-1 APPARATUS

The apparatus for this test consists of an arrangement (*see* Fig. 2) to load the pencil slip gradually. The slip is supported on two smooth knife edges, 127 mm apart, and loaded in the centre.

B-2 PROCEDURE

B-2.1 The balancing load L shall be so positioned that it balances the container C. The slip under test shall then be placed on the knife edges perpendicular to them. Lead shots shall be added gradually to the container C, till the slip breaks. Four times the weight of the lead shots which the slip under test was able to bear gives the value of the strength of the slip.

NOTE — As the diameters of the slips vary from one grade to another and from one manufacturer to another, the fibre stress (f) which gives the strength of the slip independent of the diameter may be calculated with the formula given below:

$$f = \frac{M}{I} \times h$$

where,

I = moment of inertia of the area of cross-section about the neutral axis,

M = bending moment, and

h = distance of the farthest fibre from neutral axis.

and

$$M = \frac{Wt \times l}{4} = \frac{Wt \times 1.27}{4}$$

where,

Wt = load in g at which the slip breaks,

l = distance between the knife edges.

For slips of circular cross-section

$$I = \frac{\pi d^4}{64}$$

where,

d = diameter of the slips in cm, and

$h = \frac{d}{2}$

for slips of rectangular cross-section

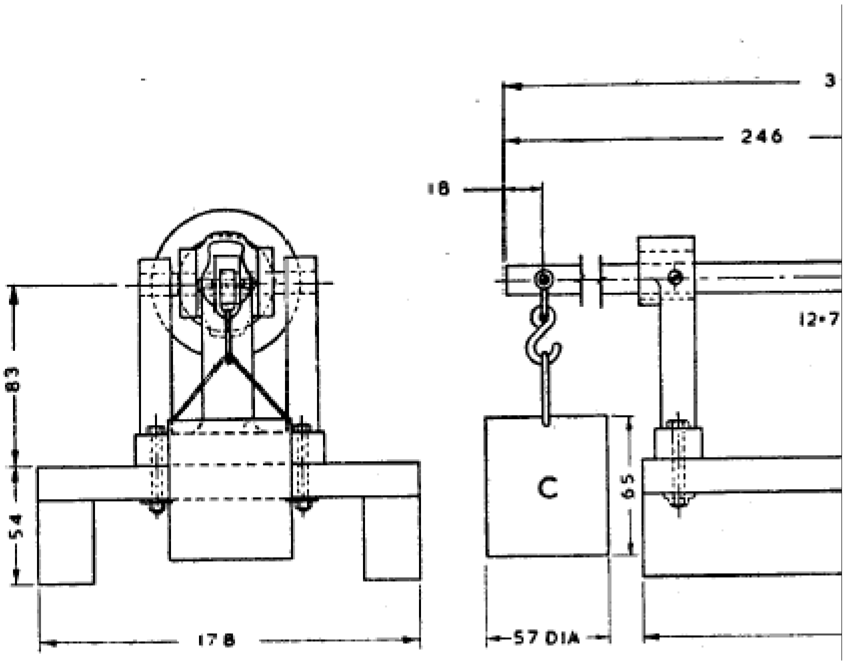
$$I = \frac{bt^3}{12}$$

where,

b = breadth

t = thickness of the slip, and

$h = \frac{t}{2}$



All dimensions in millimetres

FIG. 2 TRANSVERSE TEST MACHINE

ANNEX C

(*Clause* 7.5)

DETERMINATION OF WEAR OF PENCIL SLIP

C-1 APPARATUS

C-1.1 The apparatus for this test consists of a travelling microscope body or any other convenient arrangement, where the microscope is replaced by a pencil holder (*see* Fig. 3). A 3/O Grade sand paper shall be fixed on the flat top surface of a wooden or any other suitable platform with the help of clips. The platform shall be fixed either to the table or to the travelling microscope body with a suitable arrangement. The load on the pencil, including the weight of the holder, shall be 575 ± 3 g.

C-1.2 The pencil slip holder (*see* Fig. 4) shall have markings from 0 to 80 mm. The socket in which the holder moves shall have 40 markings, each at a distance of 39/40 mm. A groove shall be made in the holder and a screw fixed in the socket, so that the holder does not rotate in the socket but moves only in vertical direction.

C-2 PROCEDURE

The slip under test shall be cut square to its length and a piece of suitable length shall be fixed in the holder. In the case of carpenter's pencil slip, it shall be so fixed that the lines are drawn in the direction of the maximum cross-section of the slip. The holder shall then be slid into its socket and the weight placed on it. A few lines shall be marked on a separate sand paper placed on the platform to make the writing end of the slip flat. The holder shall then be taken to the extreme position and the reading noted down. A line, 12 cm long, shall then be drawn slowly. By shifting the holder by 1.5 mm, another line shall be drawn in the opposite direction. In this way, after drawing four lines, the holder shall be taken to the starting position and the reading of the holder shall be noted down. The difference in the two readings shall give the wear of the pencil for four lines. Four more lines shall be drawn and the mean of the two values shall give the wear of the pencil slip.

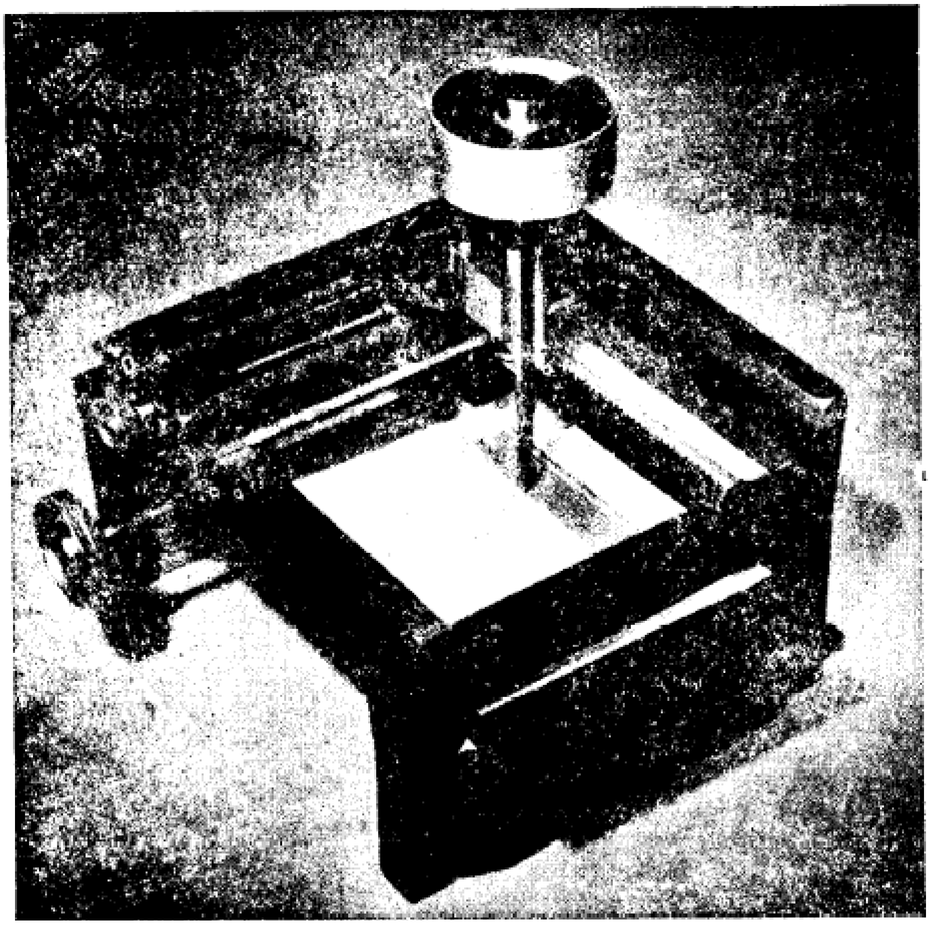
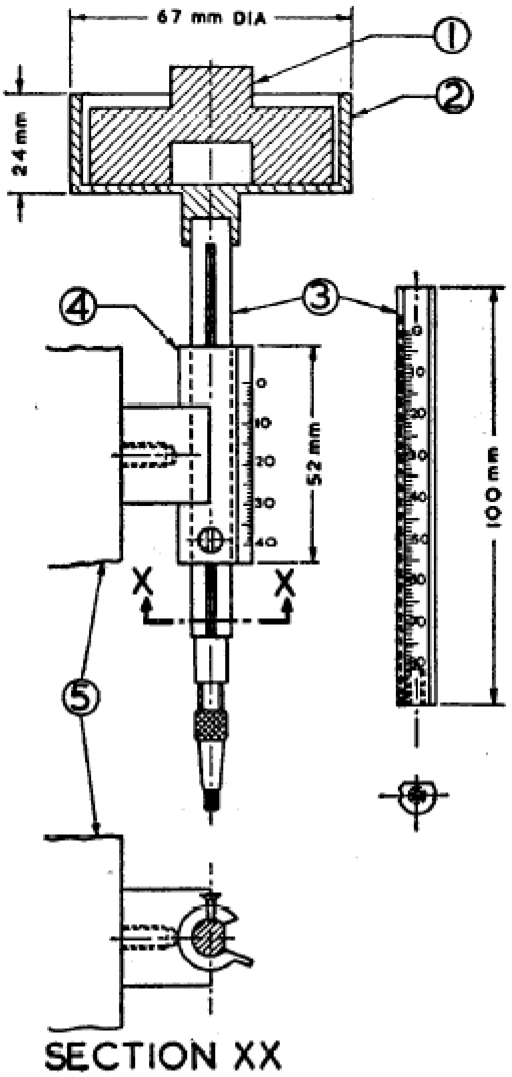


FIG. 3 APPARATUS FOR DETERMINING WEAR OF PENCIL SLIP



Legend:

1. Weight 2. Container 3. Slip Holder 4. Vernier 5. Travelling microscope body.

Fig. 4 Slip Hlder Assembly

ANNEX D

(*Clause* 7.6)

DETERMINATION OF FRICTION OF PENCIL SLIP

D-1 APPARATUS

D-1.1 The apparatus for carrying out this test shall consist of a trolley, 635 mm long and 127 mm wide (*see* Fig. 5). A Whatman drawing paper of the size of the trolley shall be fixed on it. The trolley shall move on two rails, 122 cm long, at a speed of about 69 mm per second. The trolley shall be connected by means of a string to the rotating pulley of an electric motor.

D-1.2 Three pencil holders shall be fixed to a triangular stand such that the distance between any two pencil holders as also the height of the stand shall be 508 mm. The total weight, including the weight of the holder and stand on the three pencil slips, shall be 640 ± 3 g. The load shall be distributed equally on the three slips.

D-1.3 A string shall be attached to the pencil stand and the other end connected to a pointer and weight arrangement, so that the force experienced by the stand is measured. The pointer readings shall be calibrated as follows:

The distance between the wooden stand and the torque meter should be kept constant. The thread connecting the pencil and the lower end of the pointer shall be disconnected from the pencil stand and replaced by a longer thread which can pass over both the pulleys and through a hole in the wooden stand. Weights shall be attached to this end of the thread and the pointer readings shall be noted down. A graph of the pointer readings and the weight is drawn and may be used to convert the pointer readings to weight in grams.

D-2 PROCEDURE

D-2.1 Three specimen from the same slip shall be cut square to their length and fixed in the holders. The upper surface of the stand shall be horizontal and 50.8 mm from the ends of the slips.

D-2.2 The Whatman paper shall be fixed to the top of the trolley and the trolley shall be kept on the extreme position on the rails towards the pointer scale. The pencil stand shall be kept on the other end of the paper. The trolley shall then be pulled. The pencil stand will be dragged along with the trolley due to friction. This frictional force shall be balanced by the pointer and weight arrangement.

D-2.3 The coefficient of friction shall be calculated as: $\frac{A}{B}$

where,

A = friction force, and

B = total load on the pencil slips.

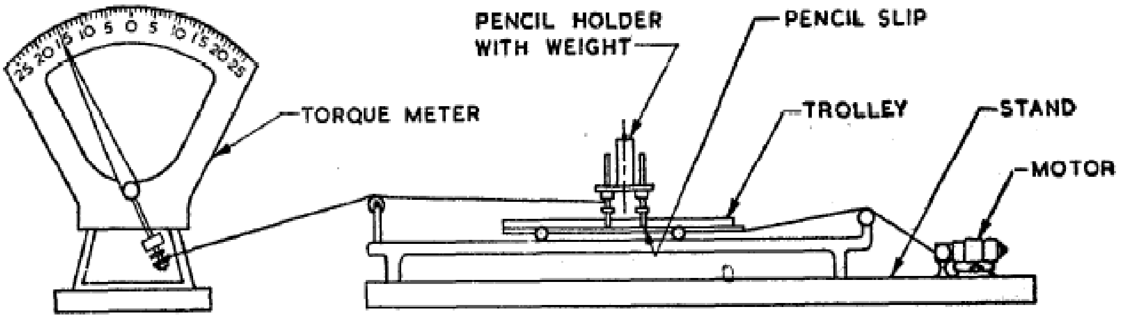


FIG. 5 APPARATUS FOR MEASUREMENT OF PENCIL SLIP FRICTION

ANNEX E

(*Clause* 7.7)

DETERMINATION OF BLACKNESS OF PENCIL MARKINGS

E-1 APPARATUS

E-1.1 Marking of Pencil Lines

The apparatus shall be similar to the one used in Annex B. Instead of the sand paper, a Whatman drawing paper shall be used. The reflectance value of this paper shall be 79 ± 2 percent.

E-1.2 Measurement of Blackness of Pencil Markings

The apparatus shall consist of a box where light shall be incident on the pencil marking at an angle of 45º and the reflected light in a direction perpendicular to the markings shall be received by a photocell which shall be connected to a sensitive galvanometer (*see* Fig. 6). The box shall be painted from inside with a white paint giving a matt surface. To the output of the photocell and in series with the circuit, a suitable opposing electromotive force shall be applied by using a dry cell and variable resistance, so that the difference in the reflectance values shall be magnified by appropriately controlling the sensitivity of the galvanometer (by using a shunt). The reflectance values shall be in the scale of zero reflectance for a perfectly black flat surface and 100 percent reflectance for a perfectly white flat surface ($MgCO_3$ block).

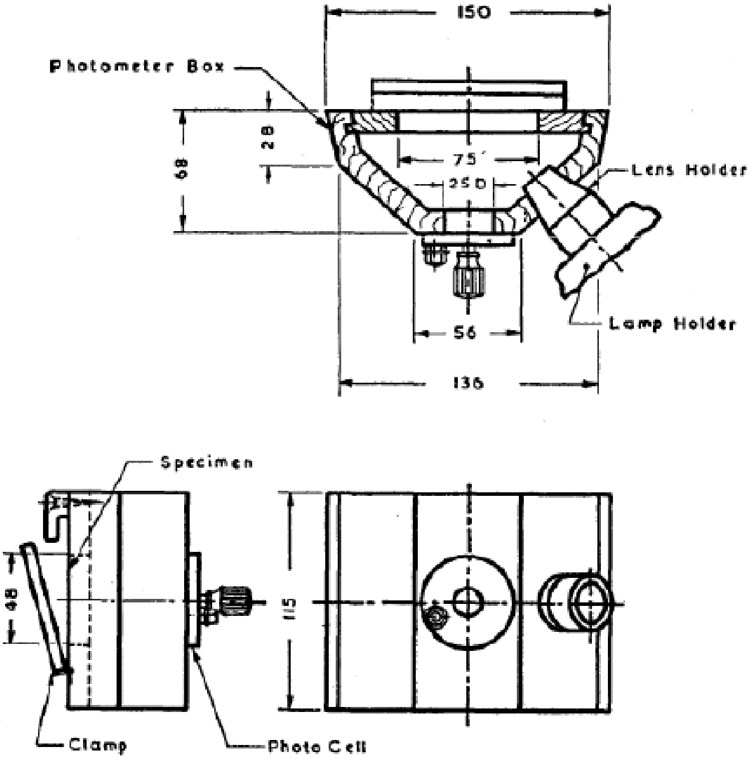
Thin metal or plastic plates of known reflectance values may also be taken. If three such plates are taken with reflectance values approximately in the range 58 to 72 and placed in the box, the galvanometer readings may be plotted against the known reflectance values. This graph, which is a straight line, may be used to convert the galvanometer readings to reflectance values.

E-1.3 The reflectance measurements shall be made with the help of the apparatus described above or any other similar apparatus (duly calibrated).

E-2 PROCEDURE

E-2.1 The slip shall be cut square to its length and the end made flat by drawing a few lines, first on a sand paper and then on a drawing paper. Thirty parallel lines, each of 12 cm length and spaced 1.5 mm from their centres, shall be drawn on the drawing paper.

E-2.2 The paper with the markings shall be placed in the box and reflectance readings shall be taken at three different positions of the markings. The mean value of these three readings shall be the blackness of the pencil markings.



All dimensions in millimeters

FIG. 6 BLACKNESS INDICATOR

ANNEX F

(*Foreword*)

COMMITTEE COMPOSITION

Organization	*Representative(s)*
Govt Printing, Govt of West Bengal Government of Indian Stationery Office, Kolkata	Shri Subir Kumar Mandal, (***Chairman***) CHD 14 Shri Bishamber Dhar (*Alternate*)
All India Federation of Master Printers, New Delhi	Shri Harjinder Singh
DIC India Limited, Kolkata	Shri U. Chowdhuri Shri Saroj Panda (*Alternate*)
Directorate of Printing, New Delhi	Shri D. K. Jain Shri K. K. Puri (*Alternate*)
National Archives of India, New Delhi	Shri Ram Swaroop Dr Sutapa Chakravarty (*Alternate*)
National Test House,	Shri Buddh Prakash
Western Printing Group, Survey of India, Delhi	Shri Equerar Ahmad
All India Printing Ink Mfgrs Association Ltd, Mumbai	Shri Ravindra Gandhi Shri R. Sridharan (*Alternate*)
Sakata Inx (India) Ltd, New Delhi	Shri Vijay Shankar Gupta Shri Sunil K. Chhabra (*Alternate*)
Shriram Institute for Industrial Research, Delhi	Dr Manmohan Kumar Dr Vinay Tyagi (*Alternate*)
SICPA India Ltd, New Delhi	Shri Arun Vig Shri A. B. Sachan (*Alternate*)
In personal capacity	Dr R. N. Ghosh
Kokuyo Camlin Limited, Mumbai	Shri Manik J. Salunkhe Mrs Sayali Suraj Sarfare (*Alternate*)
Toyo Ink India Pvt Ltd, Uttar Pradesh	Shri K. S. Murthy Shri Vivek Rastogi (*Alternate*)
Hubergroup India Pvt Ltd	Shri Rajeev Sharma Shri Rajeev Ranjan (*Alternate*)
Security Printing & Minting Corpn India Ltd, Delhi (SPMCIL)	Shri S. Mahapatra Dr D. K. Rath (*Alternate*)
In personal capacity	Shri A. K. Sinha, Ex-Director (Printing), Directorate of Printing (*Alternate*)
Whale Stationery Products Ltd, Delhi	Shri Mukesh Gupta Shri Aseem Gupta (*Alternate*)
All India Print-Tech Professionals Forum, Kolkata	Shri Partha Pratim Sanyal
Siegwerk Inks, Bhiwadi	Shri Jatin Takkar Dr Joerg Peter Langhammer (*Alternate*)
Indian Institute of Packaging	Dr Tanweer Alam Shri Subodh Kamalakar Juikar (*Alternate*)
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Yansefu Inks & Coating Pvt Ltd	Shri Jitendra Sharma Shri Neelakamal Mohapatra (*Alternate*)

Organization	*Representative(s)*
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Kumarappa Handmade Paper	DR SAAKSHY AGARWAL
Times Group	SHRI SNEHASIS ROY SHRI ANUP KUMAR PAL (*Alternate*)
The Regional Institute of Printing Technology	SHRI SHANKHYA DEBNATH SHRI KRISHNENDU HALDER (*Alternate*)
Directorate General, BIS	SHRI A. K. LAL, SCIENTIST 'E' AND HEAD (CHD) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary

SHRI SAGAR SINGH
SCIENTIST 'C' (CHD), BIS.

Bureau of Indian Standards

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: CHD 14 (11437).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi